IUPUI INDIANA UNIVERSITY PURDUE UNIVERSITY INDIANAPOLIS

Department of Economics
Working Paper Series

The Academic Gender Earnings Gap: The Effect of Market Salaries and Imperfect Productivity Measures

Paul S. Carlin
Michael Kidd
Patrick Rooney
Brian Denton

Working Paper No. 2007-03

425 University Blvd, CA 516
Indianapolis, IN 46202

THE ACADEMIC GENDER EARNINGS GAP: THE EFFECT OF MARKET SALARIES AND IMPERFECT PRODUCTIVITY MEASURES

Paul S. Carlin*
Michael Kidd**
Patrick Rooney*
Brian Denton*

December 19th, 2007

* Indiana University Purdue University Indianapolis (IUPUI), Department of Economics, Indianapolis, Indiana, U.S.A.

**Deakin University, Melbourne, Australia

Abstract:

The paper contributes to the growing literature on wage determination within academia. The data arise from a pay-equity study carried out in a single Midwestern U.S. university over the 1996-7 academic year. The focus is upon understanding differences between male-female pay, and in particular why females earn approximately 20% less than their male counterparts. Do gender differences in the balance between research, teaching and service hold the key?

Econometric results suggest that objective measures of productivity and subjective peer review ratings both play a significant role in male earnings determination. Interestingly academic productivity, however measured, fails to plays a significant role in the female wage specifications.

JEL codes: J3, J7.

The paper contributes to the growing literature on wage determination within academia. The data arise from an internally sponsored pay-equity study carried out in a single Midwestern U.S. university over the 1996-7 academic year. Our focus is upon understanding why females earn approximately 20% less than their male counterparts within the context of these specific academic environs. How do faculty balance research, teaching and service and could these factors help explain the observed gender wage gap?

The institutional data set has undergone extensive cleaning in cooperation with the faculty records office of the university. This ensures less measurement error and more accurate measures of productivity than in a typical industry level study. The data provides a rich array of standard human capital type measures in addition to two complementary measures of academic productivity. The first is a set of objective measures of research output and grant money in addition to teaching and service awards. Given the idiosyncratic nature of disciplines, comparison of measures across discipline is inherently problematic. The data set also includes a peer-review rating that in part solves the across-discipline comparison but is subjective. Finally, the data also contain information on outside-market salaries, matched to individual faculty by rank and discipline. This connects the university under study to the marketplace.

Using standard techniques of Mincer earnings regressions and pay gap decomposition on this single year of cross-section data, we explore the contribution of (i) market forces and (ii) a variety of specific measures of individual academic productivity, in explaining the gender pay gap at the university in question. While most wage gap studies in the economics literature have been carried out at the economy-wide level, the findings here should also be of interest since most wage discrimination cases are conducted at the firm level.

Previous Studies of the Academic Gender Pay Gap

Recent studies by Booth and Burton (2000), Ginther and Hayes (2003), Ginther and Kahn (2004), Geisler and Oaxaca (2005) and Euwals and Ward (2005), among others, examine the issue of academic pay. The literature focuses both on wage determination per se and male-female wage differentials within the academic labor market. Booth and Burton document the relatively slow pace of women up the academic ranks within Britain's economics departments. Euwals and Ward look at a broader set of disciplines at five Scottish universities. They conclude that controlling for individual productivity leaves no portion of the gender gap in salaries unexplained. Similarly, using data from a longitudinal survey of doctorate recipients in the U.S., Ginther and Hayes find little evidence of an unexplained salary gap in the humanities. However, they do find evidence that male faculty are promoted more quickly than their female counterparts.

In an analysis of two small US longitudinal data sets Ginther and Kahn find that female economists are less likely than males to be granted academic tenure, with part of this promotions gap apparently due to lower measured productivity. This foreshadows our findings below where we find a surprising lack of correlation between productivity and salary for female academics while measured productivity is strongly related to male academic salaries. To our knowledge the current study is the first to incorporate a wide variety of individual productivity measures including peer-review on a U.S. sample across a broad set of academic disciplines.

Empirical Model

We estimate log-linear earnings regressions of the form:

(1) $\ln E_i = H_i^{'}\mathrm{B} + S_i^{'}\Gamma + P_i^{'}\Delta + O_i^{'}\Phi + \varepsilon$,

where *H* is a vector of control variables for human capital, *S* for the market-salary factor, *P* for the peer rating variables, and *O* for the objective measures of productivity. In the initial regression we restrict analysis to include only the *H* vector on the right hand side; we subsequently add, in sequence, the *S*, *P*, and *O* vectors.

We follow this with a pay gap decomposition suggested by Neumark (1988) and Oaxaca and Ransom (1994). Oaxaca and Ransom (1994) define the gross gender wage differential as $G_{mf} = \dfrac{\overline{W}_m - \overline{W}_f}{\overline{W}_f}$. Then, taking the natural logarithm leads to $\ln\left(G_{mf} + 1\right) = \ln \overline{W}_m - \ln \overline{W}_f$, which may in turn may be decomposed into three distinct components attributable to 'male over-payment' $\left(\delta_{m0}\right)$, 'female under-payment' $\left(\delta_{f0}\right)$, and a 'legitimate' productivity component, $\left(Q_{mf}\right)$:

(2) $\ln(G_{mf} + 1) = \ln(\delta_{m0} + 1) + \ln(\delta_{f0} + 1) + \ln(Q_{mf} + 1)$

We implement the decomposition by estimating distinct earnings regressions for males and females together with the assumption that the wage structure in the absence of discrimination may be represented by the parameters of the pooled male-female specification.

Data

The current study utilizes data from the records of a large public, urban university in the United States for the 1996-97 academic year. Male annual faculty salaries were about 20 percent higher, on average, than those of their female counterparts. The university includes the usual arts and science disciplines, as well as numerous professional schools including allied health, business, dentistry, education, engineering, fine arts, journalism, law, library, medicine, music, nursing, physical education, public affairs and social work. We exclude all faculty with administrative appointments at the dean level and above, as well as librarians, scientists and the clinical supervisors of medical students (due to the difficulty in separating clinical income from university compensation). The selected sample of 851 regular faculty members includes 574 males and 277 females. All variable definitions are provided in

[Place Table 1 about here.]

Table 1, with descriptive statistics by gender included in Table 2.

[Place Table 2 about here.]

The logarithm of the monthly salary is 8.43 for female faculty relative to 8.63 for male faculty; equating to $4,572 per month for women versus $5,571 per month for men.[1] The conventional wage gap, G_{mf}, to be explained is approximately $1,000 per month, a 22 percentage point difference.

In principle, salary differences by gender may be due to productivity differences. In an innovative study of Israeli private sector firms Hellerstein and Neumark (1999) conclude that once productivity is properly measured, gender differences explain the majority of the wage gap. Ginther and Hayes provide a similar finding for a sample of faculty in the humanities. Clearly the measurement of academic productivity within a given field, never mind across fields, is somewhat problematic. However our data enable us to make some headway on this issue.[2]

In terms of productivity measurement of faculty, the data set is unusually rich, including a peer-review productivity rating together with indicators of numbers of publications, grant success and teaching and service awards. The data set also includes a market salary factor, reflecting the average US university salary by academic rank and discipline. This allows each faculty member to be assigned a market-salary factor.

We begin the empirical analysis with an uncontroversial wage specification incorporating basic measures of human capital. We then explore the role of market salary and peer review weightings and conclude with a specification incorporating objective measures of academic performance including publications, grant money and teaching and service awards.

The basic specification incorporates the following; geographic location, academic qualifications and various aspects of time relating to the academic appointment. *Remote campus appointment* controls for appointments either at a branch campus offering primarily the first two years of arts and science disciplines or at a remote site for the medical school. In principle, faculty meet the same tenure and promotion standards as at the main campus, but there is likely to be some difference in the market in which such faculty are recruited in addition to self-selection elements leading to different initial and subsequent salaries. From Table 2 we see that approximately 3 percent of female faculty versus 9 percent of male faculty are located on a remote campus. Most of this differential is attributable to the smaller proportion of women in the medical school.

Holds doctorate and *holds terminal degree* (both in the field), are measures of academic qualification. As it typically takes longer to earn a doctorate, other things equal, those fields requiring it as a minimum standard tend to pay higher wages due to the restricted entry. The same argument applies to the *terminal degree* variable; if it is not standard to obtain a doctorate to join the professoriate, the rewards to a lesser degree that is recognized as the acceptable standard (terminal) for the discipline should be substantial. Table 2 shows that male faculty are more likely to hold both doctorates and terminal degrees for their disciplines; this difference is expected to contribute to the explanation of the observed gender wage gap.

Four *time/longevity* variables capture various aspects of work experience and tenure. *Years since highest degree obtained* measures the number of years in the profession after completed training, whereas *Age in years* reflects general work experience. Controlling for the former, a higher age implies more years of work or other experience prior to earning the degree. This in turn may be associated with higher/lower earnings depending upon whether prior general human capital is valued in academic settings. A later start may also imply a depreciation of research capability in some fields and/or act as a signal of lesser academic aptitude, on average. *Years since joining current university* has an ambiguous expected effect. To the extent that universities reward years of service, one would expect a positive relationship with earnings. However, the more market-driven salaries are, longer service implies a greater distance from market premium and hence a negative effect on salary. Length of service at the university in question differs only by a year across gender but female faculty typically earn their final degree at an older age than the male faculty--five years on average. This suggests less accumulation of academic-specific human capital at any age, on average, which should in turn contribute to the explanation of lower salaries for women. *Leave of absence taken* indicates whether formal time was taken out of the academic career. Leaves for sabbatical and other professional reasons are not included in this category. The need to take formal leave may be an indicator of unusual family responsibilities or poor health; either would tend to be associated with lower cumulative productivity. In our sample almost twice as high a proportion of women as men have taken such leave.

We now turn to discuss the variables included in the extended specifications. As part of a salary review process, the university in question engaged in a peer-review rating exercise for all faculty. Each department was asked to identify senior raters who had not directly participated in salary setting determinations for the past year. To avoid divisive discussion and comparison, each rater was asked to privately rate all colleagues on a scale of 1 to 5 with 1 being poor and 5 outstanding. No one self-rated. The ratings were to be based upon research, service and teaching, with equal weights applied in the absence of a written policy indicating alternative weights. Each faculty member who was rated had several rating scores; these were averaged and rounded to the nearest integer. Only these integers are in the current data set. Those rated as 4-5 are assigned to the *High* peer- review; those with a 3 are assigned to the *Medium* peer-review; those with a 1-2 rating are assigned to the *Low* peer-review which is the reference case in the statistical analysis.[3]

This peer-review discipline-specific exercise is advantageous as it functions across disciplines and schools with differing standards. The publication of a peer reviewed article may be much more important in one discipline than another; the relative weighting of research, service and teaching may also vary across discipline. Raters may take these differences into consideration. Disadvantages of peer-review include potential subjectivity and the need to obtain the cooperation of all disciplines in the campus in a rather sensitive process. Participation in the exercise was encouraged but not mandated by central administration. As a result there are productivity ratings for a subset of 625 of our original sample of 851 faculty, i.e. approximately three-quarters of the initial sample.

In general the sub-sample with productivity ratings is similar to the full sample except that those with *remote* appointments are in units that are substantially under-represented in the productivity rating sub-sample. There are some differences in the peer-review sample by gender. Table 2 shows a greater percentage of males in the *High* rated group and a lower percentage in the *Medium*. The percentage in the *Low* rated group is almost identical across gender. This suggests a potential for peer ratings to help explain the lower salaries for female academics.

As an alternative to peer-review ratings, the university also conducted a count of the number of books and refereed articles published, as well as teaching and service awards and grant funding received. The relationship between peer ratings and the objective productivity measures is examined later in the paper. The submission of C.V.'s was strictly voluntary. Hence the measures are available for only 169 males and 115 female faculty for the full sample and 161 and 91 for the peer-review sample. Male faculty appear to publish slightly more refereed articles and books and female faculty earn more grant dollars but none of these differences are statistically significant.

The market salary factor merits further discussion. Each individual was matched by rank and discipline (undifferentiated by gender) with national salary factors provided by the College and University Personnel Association or by other reputable national or regional associations such as the Association to Advance Collegiate Schools of Business (AACSB) and the Society of American Law Teachers (SALT). The university in question is hiring from the market and thus as an atomistic player must take market-determined wages as given. On the surface, it is reasonable to treat this variable as exogenous. The employer hires from different fields as needed, consistent with the market conditions for that field. Alternatively one could argue the variable may be tainted by endogeneity via two separate mechanisms. First individuals may sort themselves into fields, at least in part due to perceived or real discrimination within the field. Second, if the university in question discriminates in terms of promotion policy by gender then once again treating the market salary factor as exogenous would be inappropriate, at least for ranks above assistant professor. Of course the same problem would occur if, instead, rank and discipline dummy variables were included directly in the wage specification.

Evaluating the gender difference in average market salary within the current sample reveals a difference of around $10,000 per year, which is of a similar order of magnitude to the observed gender gap in actual salary, i.e. approximately $1000 per month. Recall the former measure is undifferentiated by gender, implying that gender differences in field and rank are potentially important contributors to the gender wage gap. Table 2 documents clear concentration of gender by disciplinary group (i.e. school). Similarly, academic rank also differs significantly by gender, with fewer female full-professors and a greater proportion of assistant professors.

We choose to treat discipline as exogenously given. But in one specification we attempt to model rank as potentially manipulable by the university in question. We examine the sensitivity of the impact of the market salary factor (and accompanying Oaxaca decomposition) to the derivation of the variable. In the first instance we derive the market salary factor on the basis of observed discipline and rank. Second, we use the pooled sample of males and females to estimate an ordered probit to predict each faculty member's rank. The maximum probability across rank is then selected and a revised market salary factor derived on that basis. This provides an indirect method of controlling for the role of rank, absenting from any potential institutional discrimination. Given the difficulty of finding a suitable instrument, one correlated with academic rank, but not wages, we are forced to rely on the non-linearity of functional form for identification. Thus we view these results as suggestive rather than definitive.

An alternative specification would include dummy variables for rank and discipline rather than including a market salary factor.[4] Given the modest sample size, there are clear benefits of parsimony associated with including only the market salary factor. Further slicing of the data by rank and discipline results in small cell problems, requiring disciplines to be aggregated into schools. The specifications including salary factor lead to a higher adjusted R-squared compared to adding separate dummy variable controls for rank and school. [5]

Results

Table 3 contains the econometric results for specifications estimated over male and female samples separately. We present the results only for the key variables; a complete set of results is available from the authors. The top panel reports the results for the full sample, with the first two columns providing results for the basic human capital specification, and the second two columns adding a quadratic in the market salary factor.

The goodness- of-fit measure, R^2, jumps significantly for both genders, supporting the notion that the market salary factor has a strong influence on the

[Place Table 3 about here.]

salaries paid by an individual institution. Both the linear and quadratic term are statistically significant at the most conservative levels, suggesting an important positive (but declining) contribution of market salary up to about $109,000 for men and $94,000 for women.[6]

Next consider the peer review sample results in the bottom panel of Table 3. The sample size declines from 574 (277) to 418 (207) for men (women) respectively. As in the top panel, the first 2 columns exclude the market salary factor. The peer review rating variables, *Medium* and *High* are both positive and significant for men, and increasing as expected, (recall the default is *Low* peer review). However, somewhat surprisingly, the female estimated coefficients are very small and statistically insignificant at conventional levels. Apparently female faculty are not rewarded according to peer-review or perceived productivity.

We suggest three possible explanations for the insignificant effect of the peer review ratings for women. Unfortunately, the data do not permit us to discriminate between the alternate explanations. The directive given to peer reviewers was to apply equal weights to research, service and teaching in the absence of a written policy specifying alternate weights. Units without a formal written policy may have used equal weights for the rating process even if research accomplishments dominated the salary-setting process. If female faculty disproportionately take on service and teaching tasks that are poorly rewarded in terms of salary but viewed as important for the mission of the

University – this would explain the insignificant impact of peer- review for female faculty. There is some casual evidence consistent with this interpretation; in 1999 only 32 percent of the faculty were female but women chaired 38 percent of the university's administrative and governance committees.

A second related explanation is that the weightings adopted by peer raters for research, service, and teaching systematically differ by gender. Sixty-five percent of women faculty are in the two school groupings, *allied health, nursing, social work* and *liberal arts, fine arts, library science, continuing studies*. It seems reasonable to suppose that women will, therefore, on average, have more women rating them than will men. Suppose women tend to weight service and teaching achievements more heavily in their peer reviews. If salaries within these disciplines are set primarily by national markets which tend to emphasize research accomplishments, female faculty salaries would be largely orthogonal to their peer productivity ratings. Unfortunately we lack the data to provide evidence on this proposition. No information was collected on the characteristics of raters and the raw rating forms were destroyed to protect confidentiality. Finally, there were no ratings breakdowns by research, service and teaching, which may have facilitated further analysis.

A final possible explanation is based on the notion that men and women may bargain differently over pay. McDonald and Thornton (2007) confirm earlier evidence that college major explains much of the initial gap in male and female starting salaries after college, but a small gap remains. Their analysis suggests that men may negotiate for higher initial salaries while women may accept the initial offer. Gerhart (1990) reported similar findings and speculated that "...women may be less willing than men to bargain for a higher starting salary." It may also be that, in academia, men are more likely than women to use productivity revealing events (like publications, editorships and awards) as a bargaining chip to negotiate a higher salary and/or a promotion. Or it could be a timing issue, with men asking for the pay raise or the promotion sooner than women.

Turning to a discussion of columns 3 and 4 in the bottom panel of Table 3, overall the results are similar. External validation as reflected by the quadratic in market salary factor has a strong and statistically significant effect on both male and female faculty salaries. Once again however internal assessment via peer- review plays a significant role in male wage determination only.

The final set of regression results to be considered, before examining the Oaxaca decomposition analysis, are included in table 4; we focus on including counts of academic productivity items, namely the number of refereed articles, and books, as well as measures of teaching and service awards and grant money. Table 4 documents the results from the sample of all faculty who submitted C.V.'s.[7] The key influence of the market salary factor is maintained on this sub-sample. Controlling for market factors, two objective productivity measures (books and grant dollars) are significant for male academics, with a third category, teaching awards, marginally significant. Publishing an extra book raises a male academic's salary by one percent; doubling a male professor's research grant dollars results in a four-tenths of a percent higher salary; and winning two extra teaching awards raises his salary by 1.4 percent.[8] None of these objective measures play a significant role for women. The standard errors are higher for women, suggesting the insignificant effect of these measures is partially due to greater noise but, with the exception of research grant dollars, the estimated coefficients are also smaller for women.

[Insert Table 4 about here.]

One possible reason behind the insignificant role of objective productivity measures is the inability to control for the quality dimension. This is particularly true for the number of refereed articles; controlling for quality is difficult within discipline, with the difficulties magnified across discipline. Despite the problems associated with objective measures of academic productivity, there is no evidence to suggest that the accuracy of the measures differ by gender. Gender would have to be correlated with the quality of publications for this explanation to be valid. Thus, once again, just as in the case of peer review, objective measures of productivity including published books, research grant success and teaching awards appear to play a positive and significant role in male wage determination but are insignificant for females. This is a striking result.

Decomposition.

The Oaxaca and Ransom decomposition results are displayed in Table 5; almost all estimates are significant at the .05 level or above. The decompositions assume that, in the absence of discrimination, the wage structure would be represented by the pooled male-female parameters. In terms of the columns, the main items of interest in the table are: the sum of the first two columns, which gives in logarithmic form, the unadjusted earnings gap, $\ln(G_{mf} + 1)$. Thus the first 2 columns decompose the overall gender difference in log wages into the traditional unexplained and explained components. One can immediately discern that the component due to male-female differences in productivity (column 2) explains a large proportion of the overall gender wage gap across all wage specifications. Column 3 divided by the sum of columns 3 and 6, represents the residual portion of the earnings gap that remains unexplained after controlling for productivity-related characteristics. Columns 4 and 5 reflect the extent of male over-payment and female under-payment respectively.

[Insert Table 5 about here.]

Row I of Table 5 represents the basic human capital model estimated on the full sample; Row II adds the quadratic market salary factor. Rows III through VI display the results for the peer rating sub-sample, with the basic human capital model (III), augmented by the peer ratings (IV) and the market salary factor (V) and, finally, by both peer-ratings and salary factor (VI). Rows VII and VIII show the results for the objective measures sample with the basic human capital model (VII) and then augmented by objective productivity measures (VIII).

Row I reveals that the unadjusted earnings gap, in logarithms, is .197, equivalent to a gap of 21.8 percent. Applying the basic human capital model leaves 25 percent of that gap (5.45 percentage points) unexplained. In row II we learn that including market salary factors along with the basic human capital specification reduces the unexplained proportion from 25 percent to about 12 percent (2.6 percentage points).

The unadjusted gap to be explained for the peer rating sub-sample (Rows III – VI) is slightly larger at 24 percent. But the basic human capital and market factors have the same effects, with 31.4% of the gap left unexplained by the basic model (III) and 18 percent (4.3 percentage points) remaining after the salary factors are added in (V). In marked contrast, adding the peer-review rating measures to the basic human capital model has almost no effect on the unexplained proportion of the salary gap, confirming the earlier results showing that female academic salaries are not responsive to peer review assessment. Finally we arrive at the objective measures sub-sample (Rows VII and VIII) with an unadjusted gap of 20.0 percent. The basic human capital model, augmented by salary factors leaves 10.2 percent of the gap unexplained; adding the objective measures of productivity has an even more confounding effect than found for the peer ratings, as it *raises* the unexplained portion of the gap from 10.2 percent to 13.8 percent. Once again, whether productivity is measured by peer ratings or objective counts, the lack of responsiveness of female salaries to these measures shows up by either having no effect or *increasing* the unexplained portion of the salary gap.

The final two rows (II*, V*) replicate the earlier results (II and V) except that the salary factor for each individual is now derived from their predicted rank (via an ordered probit specification pooled across genders) rather than actual rank. Here we allow for the possibility that discriminatory promotion of males could result in the assignment of systematically higher market salary factors.[9] The unexplained portion of the earnings gap rises from 12.2 percent (II) to 16.6 percent (II*), consistent with the notion that the salary factor may pick up some gender-differentiated promotion propensities. This result is confirmed by a similar rise, for the peer-ratings sub-sample, in the unexplained portion from 17.7 percent (V) to 23.3 percent (V*). Hence taking rank as exogenously given, rather than allowing for differential promotion by gender tends to over-state the proportion of the gender earnings gap explained by productive characteristics. We note, also, that regardless of whether or not the salary factor is adjusted as described above, it plays a crucial role in the decomposition. Without this correction, adding the salary quadratic cut the unexplained gap in half, i.e. compare rows I and II; with the correction, the salary quadratic still lowers the unexplained gap by 30 percent, i.e. compare rows I and row II*.

Overall the decomposition has confirmed both the familiar findings and the startling anomaly in the earnings regressions. Standard productive characteristics explain much of the gender earnings gap and market forces explain a considerable portion of what remains, leaving an unexplained gap of between two and six percentage points depending on the specification employed. In turning to finer measures of productivity, however, we observe a real puzzle. Added controls for productivity should reduce the gap between female and male earnings. But controlling for productivity by subjective peer ratings fails to lower the unexplained portion of the earnings gap; controlling for productivity by objective measures *raises* rather than *lowers* the gap. The lack of reward for female productivity carries over from the earnings regression to the decomposition exercise.

Next consider a more direct examination of the productivity reward issue. Table 6, column 1, reports the results of running the basic human capital specification on the

[Insert Table 6 about here.]

peer rating sample with interactive dummies for female and peer rating (*Medium* and *High*); column 2 reports an equivalent specification for the objective productivity measures. The column 1 results show that for men, peer review is strongly rewarded but that the rewards are significantly dampened for female academics in the *High* productivity category; the dampening of rewards for female academics in the *Medium* category is also substantial but not significant. The column 2 results on the much smaller objective measures sample show similar effects with negative interaction terms but none are statistically significant. As mentioned previously the objective measures inadequately control for quality or visibility, but there is little reason to expect that this varies by gender.

The comparative lack of reward for female productivity is a puzzle. Future work should try to sort out which of the explanations offered earlier for the peer rating puzzle seems most plausible: (i) women take on service and teaching activities which are well respected within an institution but not recognized in terms of salary; (ii) different peer weights on research, teaching and service for female and male raters; and (iii) different female and male bargaining propensities.

To explore this a bit further, consider columns (3), (4) and (5) of Table 6 which report the marginal effects from an ordered probit regression which relates the peer rating category (*High*, *Medium*, *Low*) probabilities to the objective measures. The sample including both peer ratings and objective measures includes 251 observations. In the run reported here, there are no controls other than gender, the objective measures and the gender interactions. The small sample size precludes allowing the rewards to academic productivity measures to differ by discipline. This is unfortunate, as argued earlier; the idiosyncratic nature of disciplines implies rewards are likely to differ by subject area. Also because some of the explanatory variables may be correlated with the error term, we view these results as suggestive, rather than definitive.[10]

Consider the research counts first. All three elements (*books*, *refereed publications* and *grant dollars*) raise the probability of a *High* rating for male faculty members although only the *books* effect is significant. The *book* and *grant dollar* effect for women is essentially the same as for men while the effect of *refereed publications* on the probability of getting a *High* rating is significantly lower for women. *Teaching* and *service awards* have no significant effect for male faculty. For female faculty, teaching awards substantially increase the probability of a *High* peer rating. The *service award* effect is significantly lower for female faculty and is not significantly different from zero.

Overall although the effects are imprecisely estimated, most of the results appear intuitively sensible. The significant positive effect for *teaching awards* on female faculty ratings is consistent with the view that females are overly concentrated in fields where teaching is weighted heavily. The dampening effect of *female* on the rating effect of refereed publications is also consistent with that view and may be a contributory factor in understanding the lack of productivity rewards for female faculty.

Conclusions

Once we control for market salary factors and include either imperfect measure of faculty productivity, subjective peer rating or objective counting of academic production, there appears to be an unexplained gender wage gap of three to four percent. If we also adjust the rank before assigning the market salary factor, to control for potential discrepancies in promotion rates by gender, the resulting unexplained wage gap could be as high as 5.1 percent. The two highest figures, 7.5 and 8 percent, include no controls for average outside salary and hence, if the university in question is an atomistic competitor, result from misspecification. Hence, despite the productivity reward puzzle, we place the most plausible range for the unexplained salary gap at three to five percent.

The econometric results demonstrate that academic productivity, whether assessed subjectively by peers or objectively, but noisily, by counting output indicators, contributes significantly to male but not female earnings. This is a striking result and complements the finding of Ginther and Kahn (2004) that married female economists with children are as productive as their male counterparts but receive tenure at a lower rate. Although we report some weak support for the notion that the discrepancy is due to female faculty taking on more teaching and service roles, we cannot definitively resolve this puzzle with our current data. Future work should explore whether (i) women faculty take on, disproportionately, service and teaching activities that are respected internally but not valued in the academic job market; (ii) male and female academics apply different weights in their peer rating of colleagues; (iii) there are different female and male salary negotiating strategies; or (iv) quality adjustments to publication counts would clarify the differential effect by gender. Our results also suggest a pivotal role for the market salary factor by discipline and rank. Taking the university in question as an atomistic competitor, there is not much the individual university can do, by itself, to address the remaining gender earnings gap. However, the results overall suggest attention to the important role of promotion and rewarding perceived and measured productivity; these appear to be important sources of remaining gender pay differentials in academia.

References

Booth, Allison L. and Jonathan Burton. 2000. “The Position of Women in U.K. Academic Economics.” Economic Journal, Vol.110, No. 464 (June), pp. F312-F333.

Euwals, Rob and Melanie E. Ward. 2005. “What Matters Most: Teaching or Research? Empirical Evidence on the Remuneration of British Academics.” Applied Economics, Vol. 37, No. 14, pp. 1655-1672.

Fields, Judith and Edward N. Wolff. 1995. “Inter-industry Wage Differentials and the Gender Wage Gap,” Industrial and Labor Relations Review, Vol. 49 (October), pp. 105-120.

Geisler, Iris and Ronald L. Oaxaca. 2005. “Faculty Salary Determination at a Research I University.” Unpublished paper, University of Arizona.

Ginther, Donna and Kathy J. Hayes. 2003. “Gender Differences in Salary and Promotion for Faculty in the Humanities.” Journal of Human Resources, Vol. 38, No. 1, pp. 34-73.

Ginther, Donna and Shulamit Khan. 2004. “Women in Economics: Moving Up or Falling Off the Academic Career Ladder.” Journal of Economic Perspectives, Vol. 18, No. 3, pp. 193-214.

Hamermesh, Daniel S. and Jeff E. Biddle. 1994. “Beauty and the Labor Market.” American Economic Review, Vol. 84, No. 5, pp. 1174 – 1194.

Hellerstein, Judith K. and David Neumark. 1999. "Sex, Wages, and Productivity: An Empirical Analysis of Israeli Firm-level Data." International Economic Review, Vol. 40 (February), pp. 95-123.

McDonald, Judith A. and Robert J. Thornton. 2007. "Do New Male and Female College Graduates Receive Unequal Pay?" Journal of Human Resources, Vol. 42, No. 1 (Winter), pp. 32-48.

Mincer, Jacob. 1978. "Family Migration Decisions," Journal of Political Economy, Vol. 86 (October), pp. 749-773.

Neumark, David. 1988. "Employers' Discriminatory Behavior and the Estimation of Wage Discrimination," Journal of Human Resources, Vol. 23 (Summer), pp. 279-295.

Oaxaca, Ronald L. and Michael R. Ransom. 1994. "On Discrimination and the Decomposition of Wage Differentials," Journal of Econometrics, Vol. 61 (March), pp. 5-21.

U.S. Court of Appeals, Fourth Circuit. 1995. "Smith, DeGenaro, Belloni, Rimler, and Rosenbaum vs. Virginia Commonwealth University", No. 94-2187. Argued 4/5/95; decided 8/24/95.

Notes

[1] At the university in question, appointments are considered either ten-month (for the academic year) or twelve-month for the calendar year. We therefore divide by 10 or 12, as appropriate, to arrive at a comparable monthly salary for all faculty. In some other universities, an academic year appointment would be counted as nine months. Dividing by ten may be viewed as imparting a small downward bias to the salaries of academic year appointees; 66% of female faculty are academic year appointees while only 53% of male faculty are academic year appointees.

[2] There is an added legal reason for making the effort. At least one court has found in favor of the plaintiffs in a reverse discrimination suit, citing among other things, a failure to control for productivity (U.S. Court of Appeals [1995]).

[3] Because of concerns about the confidentiality of the ratings, the forms were destroyed after the ratings were entered in the database.

[4] This approach is subject to the same criticism, i.e. endogeneity of rank.

[5] The inclusion of rank and discipline as a substitute for the salary factor does not alter the sign of any important significant variables nor does it alter significance. These results are available from the authors. [Editor, please see Appendix Tables A1 and A2.]

[6] For the regression analysis the linear term for salary factor is divided by 10,000 and the quadratic term is divided by 1,000,000.

[7] The results for the somewhat smaller sample of faculty with both peer ratings and objective counts are very similar.

[8] In a study of British academics, Euwals and Ward (2005) find similarly that published books, and refereed papers, along with number of grants awarded and teaching quality are positively associated with movement up through a salary scale that is otherwise fixed by national negotiation.

[9] The potential endogeneity of discipline sorting by gender is ignored for the purposes of this paper.

[10] In the spirit of Hamermesh and Biddle (1994), suppose that individuals with charisma are both more likely to impress future editors and referees at conferences and also more likely to impress peers who do the ratings. Then the objective measures (depending on the decisions of the impressed, or not, editors and referees) are endogenous in the peer ratings equation.

Table 1. Variable definitions.

I. Basic set of explanatory variables

Location

Remote. A dummy variable equal to 1 if the faculty member holds appointment at other than the main campus, and 0 otherwise.

Qualification

Holds doctorate. A dummy variable equal to 1 if the faculty member holds a doctorate as highest qualification, and 0 otherwise.

Holds terminal degree. A dummy variable equal to 1 if the faculty member holds the terminal degree for the field whether a doctorate or other degree, and 0 otherwise.

Time/longevity

Age. The faculty member's age in years.

Leave of absence. A dummy variable equal to 1 if the faculty member has taken formal leave time apart from sabbatical of 1 to 24 months, and 0 otherwise.

Years since highest degree obtained. The number of years since the faculty member obtained the qualifying degree.

Years with current university. The number of years the faculty member has spent with the current university.

School (reference case is liberal arts, fine arts, continuing studies and library science)

Allied health, nursing, social work. A dummy variable equal to 1 if the faculty member has an appointment in one of these schools, and 0 otherwise.

Business, journalism, law, public affairs. A dummy variable equal to 1 if the faculty member has an appointment in one of these schools, and 0 otherwise.

Dental. A dummy variable equal to 1 if the faculty member has an appointment in this school, and 0 otherwise.

Education, physical education. A dummy variable equal to 1 if the faculty member has an appointment in one of these schools, and 0 otherwise.

Engineering, science. A dummy variable equal to 1 if the faculty member has an appointment in one of these schools, and 0 otherwise.

Medical. A dummy variable equal to 1 if the faculty member has an appointment in this school, and 0 otherwise.

Productivity ratings (reference case is the low productivity group-those receiving average ratings of 1 or 2)

Medium productivity. A dummy variable equal to 1 if the faculty member received an average rating of 3 which represented a satisfactory, and 0 otherwise.

High productivity. A dummy variable equal to 1 if the faculty member received an average rating of 4 or 5, which represented an outstanding rating, and 0 otherwise

Market Salary factor

Average salary. The average academic year salary reported for the faculty member's rank and discipline in a published national salary survey.

Logarithm of monthly salary. The natural logarithm of the faculty member's monthly salary, with monthly salary obtained by dividing annual salary by 12 months for those with year round appointments and by 10 months for academic year appointments.

Awards

Teaching award, University service award, Log (grant funding).

Table 2. Variable means for regular faculty sample, all variables.

Dependent Variable	Female Sample Mean	Male Sample Mean
Logarithm of monthly salary	8.428	8.625
Independent Variables		
Location		
Remote campus appointment	0.032	0.094
Qualification		
Holds doctorate in field	0.704	0.896
Holds terminal degree in field	0.834	0.957
Rank		
Assistant professor	0.335	0.206
Associate professor	0.403	0.385
Professor +	0.158	0.374
Salary Factor		
Average academic year salary for given discipline and rank	48,018.69	58,818.99
School		
Allied health, nursing, social work	0.397	0.042
Business, journalism, law, public affairs	0.087	0.123
Dental	0.061	0.120
Education, physical education	0.072	0.042
Engineering, science	0.076	0.285
Liberal arts, fine arts, continuing studies, library science	0.249	0.195
Medical	0.058	0.193
Time/Longevity		
Age in years)	48.70	48.74
Leave of absence	0.134	0.076
Years in rank	9.38	9.90

Table 2 (continued)

Independent Variables	Female Sample Mean	Male Sample Mean
Time/Longevity (continued)		
Years since highest degree obtained	15.33	20.13
Years at current university	13.65	14.71
Peer ratings*		
Low productivity	0.145	0.139
Medium productivity	0.435	0.390
High productivity	0.420	0.471
Objective measures[†]		
Books	0.57	0.86
Log of grant dollars	7.019	5.456
Refereed publications	5.45	5.80
Service Award	1.33	0.79
Teaching award	1.45	1.26
Sample size	277	574
Productivity rating sample*	207	418
Objective measures sample[†]	115	169

Table 3: Semi-logarithmic earnings regression results for the basic specification (I)
[heteroskedastic standard errors in parenthesis]

Top Panel: Full sample.

	Basic Set (I)		**Basic Set (I) + Salary Factor**	
Explanatory Variable	Male	Female	Male	Female
Salary Factor				
Average academic year salary			**0.256***** **(0.030)**	**0.257***** **(0.036**
Average academic year salary squared (divided by 1000)			**-0.117***** **(.023)**	**-0.136***** **(.031)**
R^2	**0.369**	**0.497**	**0.627**	**0.717**
N	**574**	**277**	**574**	**277**

**** indicates a significant coefficient at the .01 level.*
Each specification includes a constant, remote appointment, holds doctorate, holds terminal degree, age and its square, leave of absence, years since highest degree obtained and its square, years with current university and its square.

Bottom Panel: Peer rating sample.

	Basic Set (I) + Peer Rating		**Basic Set (I) + Peer Rating + Salary Factor**	
Explanatory Variable	**Male**	**Female**	**Male**	**Female**
Peer Ratings				
Medium productivity	**0.116**** **(.036)**	**0.034** **(.041)**	**0.067**** **(.029)**	**0.032** **(.031)**
High productivity	**0.205***** **(.035)**	**-0.002** **(.042)**	**0.120***** **(.028)**	**0.005** **(.032)**
Salary Factor				
Average academic year salary			**0.269***** **(.033)**	**0.279***** **(.041)**
Average academic year salary squared (divided by 1000)			**-0.127***** **(.025)**	**-0.158***** **(.034)**
R^2	**0.423**	**0.513**	**0.668**	**0.718**
N	**418**	**207**	**418**	**207**

, **, * indicates a significant coefficient at the.10, .05, or .01 level respectively.*
Each specification includes a constant, remote appointment, holds doctorate, holds terminal degree, age and its square, leave of absence, years since highest degree obtained and its square, years with current university and its square.

Table 4: Semi-logarithmic earnings regression results for the basic specification (I) + salary + (research refereed +number of books + log of grant dollars + teaching awards + service awards), objective measures sample.
[heteroskedastic consistent standard errors in parentheses]

	Basic Set (I) + Objective Productivity Measures + Salary Factor	
Explanatory Variable	**Male**	**Female**
Salary Factor		
Average academic year salary	**0.375*** (.054)**	**0.400*** (.073)**
Average academic year salary squared (divided by 1000)	**-0.182*** (.046)**	**-0.255*** (.064)**
Objective Productivity Measures		
Number of refereed articles (divided by 10)	**0.014 (.014)**	**0.006 (.015)**
Number of books published	**0.010** (.005)**	**0.007 (.007)**
Log of research grant dollars	**0.004** (.002)**	**0.004 (.003)**
Number of teaching awards	**0.007* (.004)**	**-0.005 (.008)**
Number of service awards (divided by 10)	**-0.009 (.047)**	**-0.032 (.060)**
R^2	**0.773**	**0.802**
N	**169**	**115**

, **, * indicates a significant coefficient at the.10, .05, or .01 level respectively.*
Each specification includes a constant, remote appointment, holds doctorate, holds terminal degree, age and its square, leave of absence, years since highest degree obtained and its square, years with current university and its square.

Table 5: Oaxaca and Ransom (1994) Decomposition

	Decomposition Elements					
	(1)	(2)	(3)	(4)	(5)	(6)
Model (*specification; sample summary)*	Ln(D_{mf} + 1) *unexplained*	Ln(Q_{mf} + 1) *explained*	D_{mf} *residual*	δ_{m0} *Male Over-payment*	δ_{f0} *Female Under-payment*	Q_{mf} *Due to Productive Characteristics*
I. (*basic; full sample)*	0.051*** (.014)	0.146** (.007)	0.052*** (.014)	0.018*** (.005)	0.037*** (.010)	0.157** (.008)
II. (*basic plus salary ;full sample)*	0.026** (.010)	0.171*** (.006)	0.026** (.010)	0.009*** (.003)	0.020** (.007)	0.187*** (.007)
III. *basic; rating sample*	0.069*** (.016)	0.146*** (.008)	0.072*** (.017)	0.023*** (.005)	0.047*** (.011)	0.157*** (.009)
IV. *basic plus rating; rating sample*	0.069*** (.017)	0.146*** (.008)	0.071*** (.017)	0.023*** (.005)	0.047*** (.012)	0.157*** (.009)
V. *basic plus salary; rating sample*	0.041*** (.011)	.175*** (.006)	.042*** (.011)	.014*** (.004)	.028*** (.008)	.191*** (.007)
VI. *basic plus salary plus rating; rating sample*	0.041*** (.011)	0.175*** (.006)	0.042*** (.011)	0.014*** (.004)	0.029*** (.008)	0.191*** (.007)
VII. *basic plus salary; objective sample*	0.020** (.013)	0.162*** (.009)	0.020** (.013)	0.008* (.005)	0.012* (.008)	0.176* (.010)
VIII. *basic plus salary plus objective; objective sample*	0.026** (.013)	0.156* (.009)	0.027** (.013)	0.011** (.005)	0.016** (.008)	0.168*** (.011)
II*. *with manipulated rank on outside avg. salary index*	0.0345*** (.012)	0.162*** (.007)	0.035*** (.013)	0.011*** (.004)	0.023** (.009)	0.176*** (.008)
V*.*with manipulated rank on outside avg. salary index*	0.053*** (.015)	0.163*** (.007)	0.054*** (.016)	0.018*** (.005)	0.036*** (.010)	0.178** (.008)

*, **, *** *indicates a significant coefficient at the.10, .05, or .01 level respectively.*
(standard errors [bootstrapped] in parentheses)
Specifications: basic = basic human capital specification; salary = average salary index/factor by discipline and rank; rating= peer rating index; objective = count of articles, awards, etc.
Samples: full = entire sample of 574 male and 277 female faculty; rating sample= sample of 418 male and 207 female faculty for whom we have peer productivity ratings; objective sample=sample of 169 male and 115 female faculty members whose departments collected and submitted CV's.

Table 6: Rewards for productivity by gender: peer ratings and objective measures

	Ordinary least squares		Ordered Probit (marginal effects= change in probability of being in cell)		
Dependent Variable: Log monthly salary	(1) Coefficient Estimate	(2) Coefficient Estimate	(3) Dependent Variable: Peer Rating = Low	(4) Dependent Variable: Peer Rating = Medium	(5) Dependent variable: Peer Rating = High
Medium	0.069** (0.029)				
High	0.122*** (0.028)				
Female	0.018 (0.039)	0.009 (0.024)	-0.015 (0.020)	-0.033 (0.035)	0.049 (0.058)
Female*Med	-0.036 (0.043)				
Female*High	-0.117*** (0.043)				
Ref Pubs		0.002 (0.001)	0.002 (0.001)	-0.004 (0.003)	0.006 (0.004)
Books		0.007* (0.004)	-0.028** (0.012)	-0.059** (0.027)	0.086** (0.037)
Log grant dollars		0.004** (0.002)	-0.002 (0.002)	-0.004 (0.004)	0.006 (0.006)
Teaching Awards		.009** (0.004)	$.13x10^{-3}$ (0.005)	$.27x10^{-3}$ (0.011)	$-.39x10^{-3}$ (0.016)
Service Awards		$-3.23x10^{-5}$ (0.005)	-0.014 (0.009)	-0.029 (0.019)	0.043 (0.027)
Fem*ref		-0.002 (.002)	0 .005* (.003)	0.011* (.006)	-0.016* (.008)
Fem*books		-0.0003 (0.009)	-0.028 (0.034)	-0.058 (0.073)	0.086 (0.107)
Fem*l_grants		-0.001 (.004)	0 .002 (.004)	0 .005 (.008)	-0.007 (.011)
Fem*teach		-0.012 (0.009)	-0.019* (0.011)	-0.041* (0.022)	0.060* (0.032)
Fem*Service		-.007 (.008)	.038*** (.014)	.080*** (.030)	-0.118*** (0.042)
R^2 (cols. (1), (2)] Log -likelihood [col. (3)]	0.716	0.789	-209.08		
N	625	284	251		

*, **, *** *indicates a significant coefficient at the.10, .05, or .01 level respectively.*
(standard errors in parentheses)
The specification in columns (1) and (2) also included a constant term and controls for remote campus; possession of doctoral degree; possession of terminal degree; market salary factor; age and its square; leave of absence; years since last degree and its square; years at current institution and its square; predicted rank; and school dummy variables. The sample for columns (1) and (2) is the peer rating sub-sample. The sample for columns (3)-(5) consists of the individuals for whom we have both predicted rank and a C.V.

APPENDIX FOR EDITOR [If accepted, these tables would be "available from authors."]

Table A1: Semi-logarithmic earnings regression results for the basic specification (I), with rank and school dummy variables added. Compare to Table 3 in body of paper.

	Basic Set (I)		**Basic Set (I) + Salary**	
Explanatory Variable	Male	Female	Male	Female
Intercept	**7.588[a]**	**7.680[a]**	**7.165[a]**	**7.056[a]**
	(0.302)	**(0.327)**	**(0.229)**	**(0.247)**
Location				
Remote campus appointment	**-0.128[a]**	**-0.157[a]**	**-0.080[a]**	**-0.115[a]**
	(0.041)	**(0.036)**	**(0.029)**	**(0.034)**
Qualification				
Holds doctorate	**0.153[a]**	**0.266[a]**	**0.058**	**0.166[a]**
	(0.045)	**(0.051)**	**(0.043)**	**(0.040)**
Holds terminal degree	**0.186[a]**	**0.160[a]**	**0.014**	**0.075[b]**
	(0.093)	**(0.050)**	**(0.062)**	**(0.042)**
Salary Factor				
Average academic year salary			**0.260[a]**	**0.247[a]**
			(0.027)	**(0.035)**
Square of average salary			**-1.07E-04[a]**	**-1.29E-04[a]**
			(2.06E-05)	**(2.90E-05)**
Time/Longevity				
Age	**0.014**	**-.003**	**0.007**	**0.005**
	(0.014)	**(0.013)**	**(0.010)**	**(0.009)**
Square of age	**-1.96E-04**	**3.22E-05**	**-9.21E-05**	**-2.25E-05**
	(1.45E-04)	**(1.31E-04)**	**(1.12E-04)**	**(8.55E-05)**
Leave of absence	**-0.006**	**-.012**	**0.014**	**-.010**
	(0.023)	**(0.017)**	**(0.017)**	**(0.013)**

Table A1 (continued)

Years since highest degree obtained	**0.020**[a]	**0.028**[a]	**.007**	**0.015**[a]
	(0.007)	**(0.006)**	**(0.005)**	**(.005)**
Square of years since highest degree	**-4.83E-05**	**-4.64E-04**[a]	**1.61E-05**	**-2.20E-04**[a]
	(1.38E-04)	**(1.35E-04)**	**(1.14E-04)**	**(9.99E-05)**
Years with current university	**-0.009**	**.002**	**-0.011**[a]	**-.002**
	(0.006)	**(0.006)**	**(.004)**	**(.005)**
Square of years with current university	**.0002**	**2.45E-05**	**.0002**[a]	**5.89E-05**
	(.0002)	**(1.64E-04)**	**(.0001)**	**(1.17E-04)**
R^2	**0.5017**	**0.6110**	**0.7200**	**0.7618**
N	**574**	**277**	**574**	**277**

[a] *Statistically significant at 0.05 level.* [b] *Statistically significant at 0.10 level.*
(heteroscedastic consistent standard errors in parentheses)

Table A2: Semi-logarithmic earnings regression results for the basic specification (I), peer rating sample, with rank and salary dummy variables included. Compare to table 4 in body of paper.

Explanatory Variable	Basic Set (I) + Productivity		Basic Set (I) + Productivity + Salary	
	Male	Female	Male	Female
Intercept	**7.015[a]**	**7.185[a]**	**6.824[a]**	**6.907[a]**
	(0.301)	**(0.389)**	**(0.237)**	**(0.306)**
Location				
Remote campus appointment	**-0.198[a]**	**-0.093[a]**	**-0.064**	**-0.038**
	(0.092)	**(0.066)**	**(0.056)**	**(0.048)**
Peer ratings				
Medium productivity	**0.118[a]**	**0.046**	**0.082[a]**	**0.051[b]**
	(0.033)	**(0.036)**	**(0.025)**	**(0.029)**
High productivity	**0.217[a]**	**.050**	**0.143[a]**	**.046**
	(0.033)	**(0.038)**	**(0.024)**	**(0.031)**
Qualification				
Holds doctorate	**0.147[a]**	**0.290[a]**	**0.053**	**0.186[a]**
	(0.049)	**(0.059)**	**(0.040)**	**(0.049)**
Holds terminal degree	**0.221[a]**	**0.177[a]**	**0.031**	**0.087**
	(0.099)	**(0.058)**	**(0.062)**	**(0.051)**
Salary Factor				
Average academic year salary			**0.246[a]**	**0.262[a]**
			(0.028)	**(0.043)**
Square of average salary			**-1.01E-04[a]**	**-1.46E-04[a]**
			(2.08E-05)	**(3.78E-05)**

Table A2 (continued)

Time/Longevity				
Age	**0.030**[a]	**0.017**	**0.018**[b]	**0.007**
	(0.014)	**(0.016)**	**(0.011)**	**(0.011)**
Square of age	**-3.74E-04**[b]	**-1.58E-04**	**-2.13E-04**[b]	**-2.79E-05**
	(1.46E-04)	**(1.60E-04)**	**(1.11E-04)**	**(1.17E-04)**
Leave of absence	**0.021**	**0.003**	**0.027**	**-0.005**
	(0.022)	**(0.043)**	**(0.019)**	**(0.036)**
Years since highest degree obtained	**0.024**[a]	**0.027**[a]	**.010**[b]	**0.015**[a]
	(0.007)	**(0.007)**	**(0.006)**	**(.005)**
Square of years since highest degree	**-8.98E-05**	**-4.03E-04**[a]	**-3.95E-05**	**-2.14E-04**[b]
	(1.38E-04)	**(1.60E-04)**	**(1.15E-04)**	**(1.14E-04)**
Years with current university	**-.005**	**-1.72E-04**	**-0.009**[a]	**-0.004**
	(0.007)	**(7.69E-03)**	**(.004)**	**(0.006)**
Square of years with current university	**1.17E-04**	**1.05E-04**	**1.96E-04**	**1.40E-04**
	(1.78E-04)	**(1.96E-04)**	**(1.30E-04)**	**(1.16E-04)**
R^2	**0.5844**	**0.6151**	**0.7730**	**0.7580**
N	**418**	**207**	**418**	**207**

[a] *Statistically significant at 0.05 level.* [b] *Statistically significant at 0.10 level.*
(heteroscedastic consistent standard errors in parentheses)

Appendix A3: Complete set of results for tables 3 through 5. [For Editor]
Table 3: **Top Panel**. Semi-logarithmic earnings regression results for the basic specification (I).

	Basic Set (I)		Basic Set (I) + Salary	
Explanatory Variable	Male	Female	Male	Female
Intercept	**7.504[a]**	**7.759[a]**	**7.011[a]**	**7.378[a]**
	(0.315)	**(0.321)**	**(0.231)**	**(0.223)**
Location				
Remote campus appointment	**-0.140[a]**	**-0.174[a]**	**-0.198[a]**	**-0.183[a]**
	(0.033)	**(0.030)**	**(0.028)**	**(0.042)**
Qualification				
Holds doctorate	**0.217[a]**	**0.261[a]**	**0.066**	**0.141[a]**
	(0.040)	**(0.036)**	**(0.043)**	**(0.034)**
Holds terminal degree	**0.228[a]**	**0.173[a]**	**0.053**	**0.040**
	(0.066)	**(0.042)**	**(0.053)**	**(0.034)**
Salary Factor				
Average academic year salary			**0.256[a]**	**0.257[a]**
			(0.030)	**(0.036)**
Square of average salary			**-1.17E-04[a]**	**-1.36E-04[a]**
			(2.31E-05)	**(3.12E-05)**
Time/Longevity				
Age	**0.022**	**3.54E-04**	**0.018[b]**	**-0.005**
	(0.015)	**(0.014)**	**(0.010)**	**(0.008)**
Square of age	**-2.97E-04[b]**	**7.68E-06**	**-1.92E-04[b]**	**7.61E-05**
	(1.62E-04)	**(1.38E-04)**	**(1.10E-04)**	**(8.49E-05)**
Leave of absence	**-0.010**	**-2.64E-03**	**0.023**	**-9.54E-04**
	(0.027)	**(0.021)**	**(0.022)**	**(0.013)**

Appendix A3. Table 3, Top Panel (continued)

Years since highest degree obtained	**0.025**[a]	**0.027**[a]	**2.16E-03**	**0.014**[a]
	(0.006)	**(0.006)**	**(0.005)**	**(4.02E-03)**
Square of years since highest degree	**-6.04E-05**	**-4.90E-04**[a]	**1.16E-04**	**-2.60E-04**[a]
	(1.51E-04)	**(1.46E-04)**	**(1.17E-04)**	**(1.04E-04)**
Years with current university	**-0.011**[b]	**9.83E-04**	**-0.009**[a]	**-3.89E-03**
	(0.006)	**(0.006)**	**(4.47E-03)**	**(4.28E-03)**
Square of years with current university	**2.28E-04**	**9.36E-05**	**1.86E-04**	**1.06E-04**
	(1.81E-04)	**(1.59E-04)**	**(1.37E-04)**	**(1.09E-04)**
R^2	**0.3685**	**0.4971**	**0.6273**	**0.7174**
N	**574**	**277**	**574**	**277**

[a] *Statistically significant at 0.05 level.* [b] *Statistically significant at 0.10 level.*
(heteroscedastic consistent standard errors in parentheses)

Appendix A3. Table 3, Bottom Panel: Semi-logarithmic earnings regression results for the basic specification (I), peer rating sample.

	Basic Set (I) + Productivity		**Basic Set (I) + Productivity + Salary**	
Explanatory Variable	Male	Female	Male	Female
Intercept	**7.179[a]**	**7.306[a]**	**6.727[a]**	**7.336[a]**
	(0.383)	**(0.387)**	**(0.268)**	**(0.287)**
Location				
Remote campus appointment	**-0.195[a]**	**-0.216[a]**	**-0.019**	**-0.062[b]**
	(0.070)	**(0.045)**	**(0.049)**	**(0.032)**
Peer ratings				
Medium productivity	**0.116[a]**	**0.034**	**0.067[a]**	**0.032**
	(0.036)	**(0.041)**	**(0.029)**	**(0.031)**
High productivity	**0.205[a]**	**-1.80E-03**	**0.120[a]**	**4.78E-03**
	(0.035)	**(0.042)**	**(0.028)**	**(0.032)**
Qualification				
Holds doctorate	**0.202[a]**	**0.255[a]**	**0.046**	**0.143[a]**
	(0.042)	**(0.037)**	**(0.041)**	**(0.039)**
Holds terminal degree	**0.227[a]**	**0.196[a]**	**0.031**	**0.045**
	(0.059)	**(0.048)**	**(0.049)**	**(0.043)**
Salary Factor				
Average academic year salary			**0.269[a]**	**0.279[a]**
			(0.033)	**(0.041)**
Square of average salary			**-1.27E-04[a]**	**-1.58E-04[a]**
			(2.50E-05)	**(3.39E-05)**

Appendix A3. Table 3, Bottom Panel (continued)

Time/Longevity				
Age	**0.030**	**0.020**	**0.026**[a]	**-0.007**
	(0.019)	**(0.017)**	**(0.012)**	**(0.012)**
Square of age	**-3.92E-04**[b]	**-2.05E-04**	**-2.70E-04**[a]	**9.72E-05**
	(2.00E-04)	**(1.80E-04)**	**(1.26E-04)**	**(1.22E-04)**
Leave of absence	**0.011**	**0.006**	**0.036**[b]	**0.005**
	(0.030)	**(0.055)**	**(0.019)**	**(0.039)**
Years since highest degree obtained	**0.027**[a]	**0.026**[a]	**4.61E-03**	**0.014**[a]
	(0.007)	**(0.006)**	**(0.005)**	**(4.66E-03)**
Square of years since highest degree	**-7.98E-05**	**-4.31E-04**[a]	**4.59E-05**	**-2.63E-04**[a]
	(1.73E-04)	**(1.65E-04)**	**(1.27E-04)**	**(1.15E-04)**
Years with current university	**-9.76E-03**	**-3.32E-03**	**-0.008**[b]	**-0.007**
	(0.007)	**(0.007)**	**(4.82E-03)**	**(0.005)**
Square of years with current university	**1.97E-04**	**2.04E-04**	**1.80E-04**	**1.54E-04**
	(1.94E-04)	**(1.89E-04)**	**(1.50E-04)**	**(1.34E-04)**
R^2	**0.4225**	**0.5131**	**0.6675**	**0.7182**
N	**418**	**207**	**418**	**207**

[a] *Statistically significant at 0.05 level.* [b] *Statistically significant at 0.10 level.*
(heteroscedastic consistent standard errors in parentheses)

Appendix A3. Table 4: Semi-logarithmic earnings regression results for the basic specification (I) + salary + research refereed +number of books + log of grant dollars + teaching awards + service awards

	Basic Set (I) + Salary + Objective Productivity Measures	
Explanatory Variable	Male	Female
Intercept	**6.405[a]** **(0.399)**	**7.139[a]** **(0.292)**
Qualification		
Holds doctorate	**0.041** **(0.032)**	**0.014** **(0.101)**
Holds terminal degree	**-0.085[b]** **(0.044)**	**0.078** **(0.076)**
Salary Factor		
Average academic year salary	**0.375[a]** **(0.054)**	**0.400[a]** **(0.073)**
Square of average salary	**-1.82E-04[a]** **(4.61E-05)**	**-2.55E-04[a]** **(6.40E-05)**
Time/Longevity		
Age	**0.035[a]** **(0.018)**	**-0.009** **(0.010)**
Square of Age	**-3.66E-04[b]** **(1.91E-04)**	**1.04E-04** **(1.07E04)**
Leave of absence	**0.068[a]** **(0.014)**	**-0.005** **(0.017)**
Years since highest degree obtained	**-0.013[b]** **(0.007)**	**0.012[a]** **(0.005)**
Square of years since highest degree	**2.96E-04[b]** **(1.72E-04)**	**-2.72E-04[a]** **(1.29E-04)**
Years with current university	**-3.01E-03** **(0.006)**	**-3.95E-03** **(0.007)**

Appendix A3. Table 4 *(continued)*

Explanatory Variable	Male	Female
Square of years with current university	**5.01E-05** (1.74E-04)	**1.56E-04** (1.82E-04)
Objective Productivity Measures		
Number of articles refereed	**1.37E-03** (1.37E-03)	**6.19E-04** (1.53E-03)
Number of books published	**0.010**[a] (4.52E-03)	**0.007** (0.007)
Log of research grant dollars	**4.33E-03**[a] (1.88E-03)	**4.46E-03** (2.74E-03)
Number of teaching awards	**0.007**[b] (3.69E-03)	**-4.70E-03** (0.008)
Number of service awards	**-8.96E-04** (4.68E-03)	**-3.24E-03** (0.006)
R^2	**.773**	**.802**
N	**169**	**115**

[a] *Statistically significant at 0.05 level.* [b] *Statistically significant at 0.10 level.*
(heteroskedastic consistent standard errors in parentheses)